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Time and Frequency: Bibliography of NIST Publications

Gwen E. Bennett
Donald B. Sullivan

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U.S. DEPARTMENT OF COMMERCE, Ronald H. Brown, Secretary
TECHNOLOGY ADMINISTRATION, Mary L. Good, Under Secretary for Technology
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, Arati Prabhakar, Director

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IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control.

Proceedings of the IEEE Frequency Control Symposium (see discussion on the following page).

Proceedings of the Annual Precise Time and Time Interval (PTTI) Applications and Planning Meeting, available from the U.S. Naval Observatory, Time Service, 3450 Massachusetts Ave., N.W., Washington, D.C. 20392-5420, USA.

Proceedings of the European Frequency and Time Forum, available from EFTF Secretariat, FSRM, Rue de l'Orangerie 8, CH-2000, Neuchâtel, Switzerland.

Proceedings of the Conference on Precision Electromagnetic Measurements, published since 1962 in the IEEE Transactions on Instrumentation and Measurement.

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ABBREVIATIONS OF NIST PUBLICATIONS

On August 23, 1988, the National Bureau of Standards (NBS) became the National Institute of Standards and Technology (NIST); therefore, documents with either prefix are considered NIST publications.

There are commonly used abbreviations for the names of the NIST journals that appear in this bibliography. They are listed below:

NISTIR - NIST Interagency/Internal Report
NIST TN - NIST Technical Note
NIST SP - NIST Special Publication
NIST HB - NIST Handbook
NIST JRES - NIST Journal of Research
NIST MN - NIST Monograph

NBSIR - NBS Interagency/Internal Report
NBS TN - NBS Technical Note
NBS SP - NBS Special Publication
NBS HB - NBS Handbook
NBS JRES - NBS Journal or Research
NBS MN - NBS Monograph

NIST (NBS) Technical Notes, Special Publications, Handbooks, Journals of Research, and Monographs may be purchased from the U.S. Government Printing Office at the following address: New Orders, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Orders may be payed by major credit card, NTIS Deposit Account, or check or money order payable in U.S. dollars to the Superintendent of Documents. The Government Printing Office usually only stocks these publications for a year or two, after which they may be purchased from the National Technical Information Service at the address listed below.

NIST (NBS) Interagency/Internal Reports (NISTIRs, NBSIRs) may be purchased from the National Technical Information Service, Springfield, VA 22161. Orders may be payed by major credit card, NTIS Deposit Account, or check or money order payable in U.S. dollars to NTIS.

PAPERS INCLUDED UNDER EACH TOPIC

BROADCAST SERVICES
Includes papers that relate to satellite, radio, telephone, and computer network dissemination of time and frequency signals.

CALIBRATION METHODS
Includes papers that relate to calibration methods and calibration services of NIST as well as measurement methods supporting calibration.

CESIUM FREQUENCY STANDARDS
Includes papers relating directly to cesium frequency standards and concepts that, while not specific to cesium standards, are often applied in their design and use.

DIODE LASERS
Includes papers relating to diode lasers, particularly line-narrowed and stabilized diode lasers, and their application to a wide range of measurement problems.

ELECTRONIC CONTROL SYSTEMS
Includes papers dealing with electronic components and systems designed for or useful in time-and-frequency systems.

FREQUENCY SYNTHESIS
Includes papers dealing with electronic and optical synthesis of signals using multiplication and division techniques.

GENERAL TIME AND FREQUENCY
Includes papers of a very general nature, often covering several time and frequency topics.

GEOPHYSICAL MEASUREMENTS
Includes papers on geophysical measurement systems developed in a peripheral program of the Division. Sometimes these systems are based on timing technology.

HYDROGEN MASERS
Includes papers on both active and passive hydrogen masers.

ION STORAGE RESEARCH
Includes papers on ion storage and radiative ion cooling as applied to the development of advanced frequency standards as well as a wide range of fundamental physical studies relating to stored ions.

LASERS
Includes papers dealing with laser design and construction, newly discovered spectral lines shown to lase, and special applications of high-performance lasers to metrology and spectroscopy.

LENGTH/SPEED OF LIGHT
Includes papers relating to earlier measurement of the speed of light, the redefinition of the meter in terms of the second, the development of stabilized lasers as wavelength/length standards, and accurate measurement of the frequencies of such lasers.

MEASUREMENT METHODS
Includes papers on methods for characterizing clocks, oscillators, and other electronic components as well as methods for spectroscopic measurement.

MISCELLANEOUS
Includes all those papers with material that is not consistent with the other categories.

OTHER FREQUENCY STANDARDS
Includes papers on other non-traditional frequency standards and stable frequency references such as the superconducting-cavity-stabilized oscillator, the ammonia frequency standard, and the thallium-beam frequency standard.

QUARTZ OSCILLATORS
Includes papers on the design and performance of quartz oscillators focussing especially on noise performance and sensitivity to environmental parameters.

RUBIDIUM FREQUENCY STANDARDS
Includes papers on passive rubidium-cell frequency standards.

SPECTROSCOPY
Includes papers dealing primarily with high-resolution, infrared and far-infrared spectroscopy of atoms and molecules using frequency-measurement rather than wavelength-measurement methods.

STATISTICAL STUDIES
Includes papers on statistical measures important in the characterization of clocks, oscillators, and time-transfer systems.

TIME/THE SECOND
Includes papers dealing with timekeeping and the measurement of time.

TIME COORDINATION
Includes papers relating to the coordination (using various time transfer methods) of widely separated standards with emphasis on accuracy levels needed for international time coordination.

TIME SCALES
Includes papers on physical time scales, measurement systems used in such time scales, and algorithms used for optimally combining the outputs of an ensemble of clocks into a time scale.

TUTORIALS
Includes time and frequency papers which are judged to be easy to read. These should provide a good starting point for introduction to the field or to some subtopic in the field.

TIME AND FREQUENCY:
Bibliography of NIST Publications

Gwen E. Bennett and D.B. Sullivan
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This bibliography includes most NIST time and frequency publications dating from the development of the first atomic clock. The publications are sorted into 23 categories. While the majority of the publications cover topics that are central to time and frequency measurements and standards, the bibliography does include other peripheral publications of the Time and Frequency Division.

Key Words: atomic clock; atomic frequency standard; clock; frequency; frequency standard; ion storage; laser; laser frequency standard; primary frequency standard; time; time transfer spectroscopy

INTRODUCTION

This bibliography is meant to cover the modern era of time and frequency technology, that is, the era marked by the introduction of atomic timekeeping. The earliest publications included date from the late 1950s. The Time and Frequency Division was formed in September of 1967, and from that date forward a complete set of publications has been maintained. However, some of the earlier papers on atomic clocks have been added for completeness. We have not included papers that are not yet published, but have tried to include everything available up to the time of publication of this volume.

It is difficult to divide the papers into categories, because many of them cover several subjects. We have thus chosen to include many papers in more than one of the 23 categories which we have used. Most of these categories represent specific technical areas. Two categories, Tutorials and General Time and Frequency, have been added to bring together papers that were written for more general audiences or tutorial purposes. A Miscellaneous category is also included to pick up unusual papers that just wouldn't fit elsewhere.

Just following this page we cite a number of books, journals, and special issues of journals that cover this field. These are noted here as a resource to those new to the field. Obviously, important papers appear in other locations, but a large fraction of the papers will be found within this narrower list. Included in this list are addresses from which certain conference proceedings can be obtained.

Finally, we encourage readers to obtain needed copies of publications cited herein from local libraries or the addresses on the next two pages. We will try to help with copies of papers that are difficult to locate, but resource limitations make it impossible for us to provide reprints of all of these papers.

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